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The Computer in High School Science Instruction

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Computers appear to have a useful function in futuristic science classrooms. Urquhart (1) states, "computers have a promising future as an instructional tool in biology."

The purpose for utilizing computers as supplements to standard educational media is to simulate complex situations or demonstrate complex concepts that would be impractical to duplicate in classrooms due to time consuming computations, expense, or lack of equipment.

With these considerations in mind, and with the help of the Computer Programming instructor, Mr. R. L. Carter, computers have been introduced into the biology classrooms of Marshalltown, Iowa. Computer programs have been created by and for biology classes involving problems in genetics, evolution, natural selection, cell physiology, ecology, enzyme dynamics, photosynthesis, and pollution.

Such an approach to education requires a computer or computer access, acquisition or creation of computer programs, and problems to solve. At first Marshalltown purchased computer time from the University of Northern Iowa, but since 1973 the Fisher Governor Company of Marshalltown has made available the services of a DC^2 digital computer for classroom usage.

Figure 1 is a sample program developed for use in the Human Biology classes entitled *Alchohol and Human Behavior.* The program was developed with the help of Dr. J. T. Wilson of the Forensics Chemistry Section of the State Hygienic Laboratories at Iowa City.

This format allows students to insert body weight, type of alcohol consumed, amount of alchohol consumed, and time of consumption into the program. The computer calculates the percent of alcohol in the blood and advises students of their physical and mental state, as well as, to their individual tolerances. Such experimentation would be unallowable in classroom situations. Students may change the variables at their discretion.

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INPUT WEIGHT W:
INPUT NUMBER ØF DRINKS N:
INPUT NUMBER ØF HØURS SPENT DRINKING H:
INPUT TYPE OF DRINK
T:1 STRAIGHT SHØT  T:2 MIXED DRINK
T:3 LIQUØR  T:4 BEER (12 ØZ)
T:5 HARD CIDER  T:6 WINE
AFTER YØUR INPUTS TYPE G:1
W:125
N:6
H:1
T:4
G:1

WEIGHT 125  6 DRINKS IN 1 HØURS
YØUR % ØF BLØØD ALCØHØL IS .159
YØU ARE UNMISTAKABLY DRUNK, ALL FACULTIES SERIØUSLY AFFECTED

DØ YØU WISH TØ CHANGE VARIABLES? Y:1 YES  Y:2 NØ

Y:2
THE FIGURES YØU CALCULATE ARE AVERAGES.  INDIVIDUALS MAY VARY
SØMEWHAT IN THEIR PERSØNAL ALCØHØL TØLERANCE FØØD IN THE
STØMACH AFFECTS THE RATE OF ABSØRPTIØN.  MEDICATIØNS, HEALTH,
AND PSYCHØLØGICAL CØNDITIØN ARE ALSØ INFLUENTIAL FACTØRS.

**CCEX
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Figure 1.

The Digital Equipment Corporation, Software Distribution Center, Maynard, Massachusetts 10754 has many similar simulations in biology, chemistry, earth science, and physics which may be used by teachers prior to developing their own programs.

Interest in computer-aided education has culminated in a study conducted by the Human Resources Organization in a project titled, The Secondary School Project for Adopting Computer-Aided Education (SSPACE), which is funded by the National Science Foundation. SSPACE is investigating the processes and problems involved in introducing computer education into high schools. Additional information can be obtained from the Project Director, Robert J. Seidel, HumRRO, 300 North Washington Street, Alexandria, Virginia 22314.

The Minnesota Legislature has recently financed computer education in the secondary schools of Minnesota. If Iowa science educators are progressive, futuristic, and realistic, computers may become a standard instructional tool in Iowa's public schools.

Literature Cited

1. Urquhart, N. S. 1973. A role for computers in teaching biology. *AIBS Education Review* 2(5):65-68.